MERCURY NORTH AND SOUTH POLES: RADAR IMAGING AT 3.5 CM WAVELENGTH.

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The north and south polar regions of Mercury have been imaged using the Goldstone Solar System Radar during the inferior conjunctions of February 2001 and June 2001. The sub-Earth latitude was -10.7 deg. (South) in February during observations of the southern hemisphere, and +8.4 deg. (North) in June during observations of the northern hemisphere. These excellent viewing angles provided an opportunity to resolve the radar bright material in polar craters at 6-km range resolution. Fine-scale (1.5 km) resolution images of the northern craters have previously been obtained at 13-cm wavelength during 1999 and 2000 inferior conjunctions (Harmon et al., 2001). However, due to Mercury's south declination when the subradar point is most southerly, the Arecibo radar cannot observe the southern polar region of Mercury until 2004. Our new Goldstone 6-km resolution data are a factor of two higher resolution than the Arecibo data obtained in March 1992 at 15 km range resolution (Harmon et al., 1994) and will remain the most highly resolved images of the south polar region for the next few years.

The long-code method of delay-Doppler mapping (Harmon et al., 1992) was used to prevent aliasing of the radar return, since Mercury is nearly 5 times overspread at 3.5-cm. The north polar craters exhibit brightest reflections from material interior to their southern rims (Harmon *et al.*, 2001; Slade *et al.*, 2000), which are the areas permanently in shadow from the Sun. The south polar scene is dominated by the reflection from Chao Meng-Fu (crater). Similar radar-bright echoes and polarization inversion (SC stronger than OC) has been noted for the icy Galilean satellites since the mid 1970's (Campbell *et al.*, 1978), and is usually explained using models of coherent backscatter from icy media (Hapke, 1990).